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Computerised tomography in aetiological diagnosis of small bowel obstruction: Report of a rare case

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Abstract
Post-operative small bowel obstruction is a recognized complication following appendectomy. Computerized tomography (CT) can aid differentiate high grade obstruction, identify location and detect complications thus help in guiding management plan. We report a rare event of a band from the appendiceal stump causing small bowel obstruction, appropriately identified by CT, managed with favourable outcome.

Keywords: Post-operative, small bowel obstruction, band, adhesion, computerised tomography

Introduction
Small bowel obstruction following appendectomy is variedly reported as high as 10% [1] and this incidence is probably decreasing with the use of minimally invasive technique. Most of this adhesive small bowel obstruction can be given a trial of conservative management. [2] CT scan aids in decision making by identification of aetiology, grade and complications such as ischaemia or perforation. [3]
We report here a unique case of small bowel obstruction following appendectomy.

Case Report
A 63-year man presented to the emergency department of Civil Service hospital of Nepal, with 4 days history of crampy abdominal pain, gradual distension, multiple episodes of bilious vomiting and inability to open bowels. He had no past medical illness. He had undergone an open appendectomy 5 years ago in another hospital.
Clinical examination of this thin built man was significant for dehydration, tachycardia of 101 beats per minute, blood pressure of 110/70 mmHg. Abdomen was significantly distended, with generalized tenderness and tympanic on percussion. There were no signs of peritonitis. The previous appendectomy scar was faintly discernible and had no evidence of any hernia. Rectum was dilated and empty on digital examination.
Abdominal x-ray (Fig 1) revealed multiple loops of distended small bowel with no gas in large bowel or rectum consistent with features of small bowel obstruction.
Contrast enhanced CT abdomen and pelvis was requested because of his age, to delineate the grade and localize the site of obstruction. CT identified a terminal ileal high-grade obstruction, with faecalisation of small bowel, transition point; and collapsed caecum and rest of the large bowel. There was minimal pelvic fluid but no evidence of complications as free gas or ischaemia. The on-call radiologist reported an abnormally medially pulled caecum raising a possibility of a single band from the caecal region as the cause of this obstruction. (Fig 2, 3 and 4)
A nasogastric tube was positioned into the stomach to decompress the dilated small bowel. After resuscitation, a midline laparotomy was performed. (Fig. 5, 6, 7, 8) There was no evidence of adhesions at the previous scar site; neither there were any flimsy adhesions in the peritoneal cavity. Distended small bowel loops and collapsed large bowel was noted.
There was a band arising from the tip of the stump of the appendix extending to mesentery of jejunum thus compressing the terminal ileum. The band was divided to release the obstruction. The stump of the appendix was dissected further, which revealed at least 1cm stump from the base. It was ligated and divided. The new stump was buried with a purse string suture at caecum. The abdomen was closed in usual fashion.
In the postoperative period patient developed ileus. NG tube was removed on 2nd postop day and liquid to solid food gradually reinstated. Patient was discharged home on 5th postoperative day.

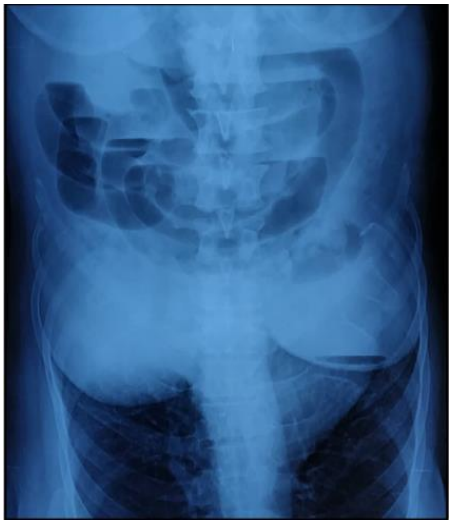

Fig 1: Abdominal Xray: multiple dilated small bowel loops, featureless shadows of ileum, more than 3 cm caliber thus pointing to more distal small bowel obstruction

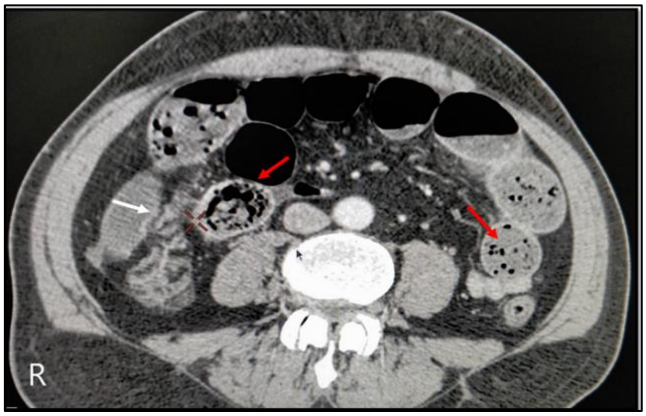

Fig 2: Axial View CT Abdomen showing transition point (white arrow), dilatation and faecalistaion of small bowel (red arrows)

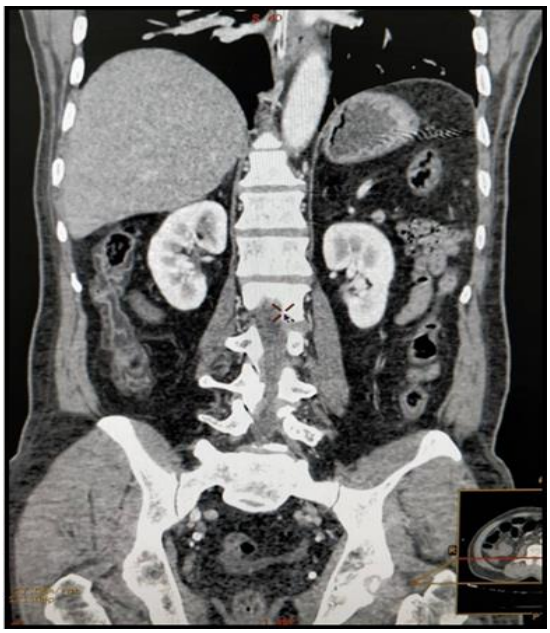

Fig 3: CT Coronal View showing collapsed large bowel

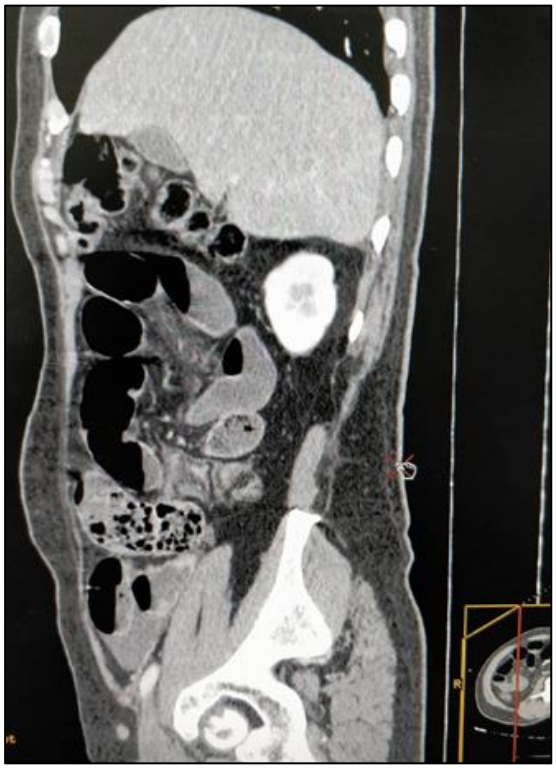

Fig 4: CT sagittal view showing abnormally medially pulled caecum

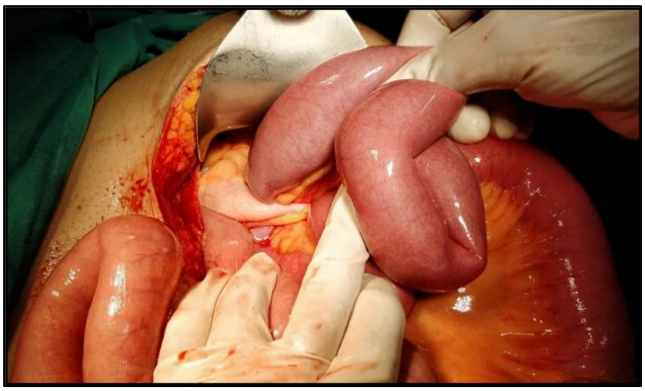

Fig 5: Intraoperative finding of medially pulled caecum, transition point and dilated small bowel

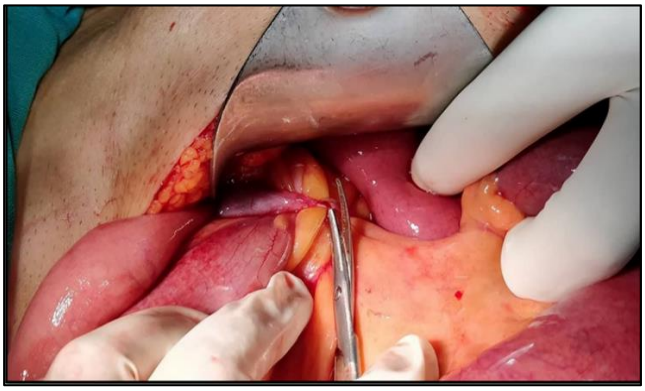

Fig 6: Intraoperative view- division of the band

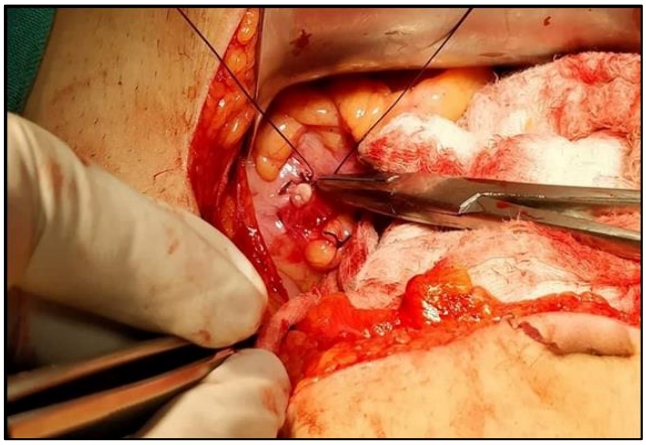

Fig 7: Intraoperative view-burying of the new stump

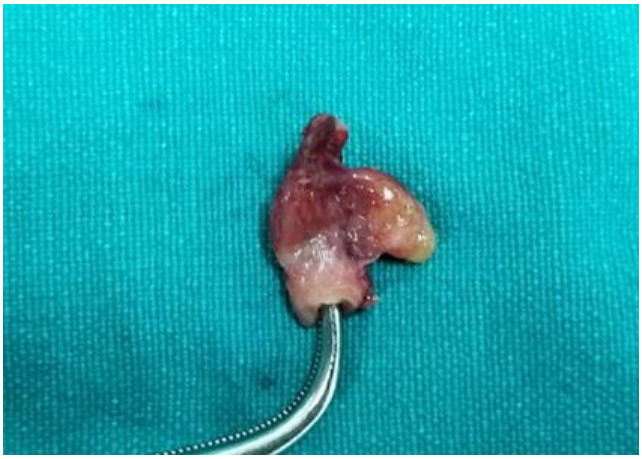

Fig 8: Specimen - the stump of the appendix with origin of the band (curved artery forceps tip at appendix stump lumen)

Discussion

Adhesions are the most common cause of small bowel obstruction and 90% of them occur after a previous laparotomy. [4] Though the incidence after a laparoscopic approach is significantly low in comparison to open access, it is still significant [5].

The incidence of small bowel obstruction after appendectomy has been variably reported in the range of 1-10% [1, 6, 7]. Usually a single band or diffuse adhesions is the cause.

Complications related to the appendiceal stump such as leak, stump appendicitis and small bowel obstruction due to stapler line adhesion have been widely recognized [8, 9].

The question to bury or not to bury the appendix stump has been in discussion for decades [10] and recent studies find no differences and more are in the favor of simple ligation only. This is reasonable citing the widespread use of laparoscopic approach, need of more challenging skills in application of purse-string or Z-sutures at the caecum, lack of definite evidence of benefit and low incidence of complications due to the stump [11].

A residual appendix of 2.5 cm length causing small bowel obstruction after Laparoscopic appendectomy has been reported [12]. However, none of the above studies have discussed an incidence of small bowel obstruction due to a band arising from appendiceal stump itself.

The role of CT scan in the management of small bowel obstruction is well established. It is the diagnostic technique of choice when aetiology of obstruction is uncertain [2]. CT scan has high diagnostic accuracy in identification of transition point, aetiology and grade of obstruction [3].

In our case, it cannot be ascertained with certainty whether the stump contributed to the band formation. We want to emphasize that the stump of the appendix should be kept to minimum possible length to avoid any complications related to it.

Conclusion and learning Point

CT scan aids in confirming aetiology and ruling out complications in post-operative small bowel obstruction, thus guiding the management. It is very important to ligate the appendix at its very base to decrease complications related to the stump. Invagination of the stump will continue to be surgeon's preference as evidence does not show added benefit of it.

Disclosures: None
Conflict of Interests: None

Appropriate consent was taken from the patient for publication of case, including images

Contributions

SR: Drafted the manuscript, reviewed the literature
AP: Performed the surgery, requested consent for publication, reviewed the manuscript
AKS: Supervised writing and finalizing the report, Revised the manuscript
PP: Reported the CT preoperatively, Provided CT images and interpretation
VCS: Supervised the operation, reviewed manuscript.

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